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dsp valley newsletter 6

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designing smart products

Flemish collaborative effort reports communication module breakthrough advancing smart metering

Imec, iMinds, and their partners in the ICON-project CoPlaSM present the final results of a two-year project to realize and validate proof of concept of a multi-standard communication module for smart metering.

Smart grids need smart communication

The sharp increase in decentralized renewable electricity production, such as the case with solar panels, creates the need for a smart two-way electricity grid.

continuation on page 2

continuation from page 1

To guarantee stability in the smart grid, continuous real-time monitoring through smart meters is required, both in the grid infrastructure and at the consumer side. The European Union is betting high on smart meters, aiming for 80 percent of the electricity meters to be smart by 2018. Moreover, the global market of smart meters is estimated to grow from $7 billion in 2012 to $35 billion in 2022.

Software-upgradeable module for coax, wireless and powerline communication

Within the CoPlaSM project, the fundaments for a highly reliable software-upgradeable multi-standard communication module have been built. When coupled with a utility meter, this communication module turns the meter into a smart meter. The multi-connectivity of the module, compatible with wireless machine-to-machine standards, coax cable, and power line communication (PLC), will enable a one-size-fits-all solution, with shorter time-to-market, lower unit price, cheaper logistics and easier and uniform installation.

Software-defined PLC solution by AnSem and NXP Semiconductors

The technical requirements of the communication module were defined by the Flemish distribution system operators Eandis and Infrax, based on a stakeholder requirement analysis and research performed with end-users (performed by iMinds research groups SMIT at VUB and MICT at UGent). The ASIC design company AnSem developed a software-defined PLC-solution. The module consists of AnSem's multi-standard PLC analog front-end chip combined with NXP Semiconductors' licensable ultra-low power CoolFlux BSP baseband processor core. It features competitive cost, performance and power consumption with current state-of-the-art, single-standard dedicated solutions. The PLC-IP and chip is demonstrated with the G3- and Eandis proprietary protocols on a Field Programmable Gate Array (FPGA) platform and is available for developers of smart home and smart grid applications through AnSem.

Towards a low-power and low-cost communication module

Imec, the iMinds research group IBCN at iMinds-UGent and iMinds-VUB are currently generalizing the architecture and software to create a module for multi-standard wireless and wireline communication, with expertise from the different industrial partners. AnSem, Eandis, Elster Energy ICT, Infrax and Laborelec provide reference operating conditions to validate the performance of the system and evaluate the suitability of different wireless and coax communication

Test & Measurement Solutions develops software application for solar roof panel data

Test & Measurement Solutions

At SEAC (Solar Energy Application Centre), an independent knowledge institute in The Netherlands, new integrated solar roof panels are researched. Aside from providing electricity, these solar panels provide extensive other functionalities such as ensuring the roof remains watertight and sound-proof. With 24/7 registration of numerous parameters by the panels, enormous amounts of data are collected, with approximately 500 sensors measuring each parameter every minute. Test & Measurement Solutions developed a software application enabling off-site analysis of the collected data.

On the left: Roland Valckenborg, Projectleider SEAC.
On the right: Arnoud de Kuijper, Managing Director Test & Measurement Solutions B.V.

The challenge:

- Diversity of collected data, coming from solar panels from different suppliers and with various specifications
- The quantity of collected data is substantial, taking into account the frequency of measuring: every second, 24/7
- Availability of collected data for multiple simultaneous users with varying levels of access on the next day
- Security of the databases; with logins for limited and assigned users only

The custom solution provided by T&M Solutions consists of a database which

standards for smart grid applications. Moreover, based on an overall system complexity analysis, energy consumption and production cost of the multi-standard communication module for smart meters are estimated.

Join our final workshop in February 2015

The final results of the CoPlaSM project - and the application perspectives for smart metering, infrastructure monitoring etc - will be presented in February 2015 (date TBC) in a workshop jointly organized by the Wireless Community and Smart Grids Flanders.

Smart Grids Flanders supports the CoPlaSM partners for the dissemination of the results towards the Flemish stakeholders. ■

CoPlaSM:
iMinds ICON project IWT project 120441
Industrial partners: AnSem, Eandis, Elster Energy ICT, Infrax, Laborelec, NXP Semiconductors;
Research partners: imec iMinds–IBCN–UGent, iMinds–MICT–UGent, iMinds–SMIT–VUB;
User committee: Smart Grid Flanders

processes collected data every night. This data can then easily be accessed by SEAC researchers from their desktop, in a secure and flexible way. At user request data is processed on the server and only the results (e.g. graphs, etc.) are transmitted to the user's desktop. The robust yet flexible solution provided by T&M Solutions allows for high-end security for accessing data yet flexible enough to allow for various forms of data to be processed by a single server.
Roland Valckenborg (SEAC): *"This database tool enables our researchers to access the measuring results of our integrated solar panels in a very flexible way, from their own desktop at any time of the day. Their expertise and reliability were the main reasons for working with Test & Measurement Solutions."*

■

Preface

Does the semiconductor industry require business model innovation?

Since many years, Moore's law is always going on, bringing the semiconductor industry to new semiconductor processing nodes. In just the same way as Moore's law is a technological law of miniaturization, it is also an economical law of always cheaper production costs for the same functionalities. Currently, the state-of-the-art technology has reached the 20 nm node, and is preparing for the next 3 nodes, down to 7 nm.

However, where the technological miniaturization is always on-going, the economical cost reduction is not following anymore. At 20 nm, the classical light sources for the patterning of the chips have a wavelength which cannot deliver anymore the desired results with single patterning. And the alternative double or multiple patterning is reducing the throughput consequently, hence resulting in higher unit costs. Without new light sources such as EUV, Moore's law is not holding anymore from an economical perspective.

But is this what we want? Is it necessary that also the economical version of Moore's law can still continue?

Currently, the business model of the semiconductor industry can be considered as a so-called "Cost+" model: foundries know what their production costs are, and then apply a certain margin, which can be variable according to demand. In times of over-capacity, margins will be lower; in times of capacity shortage, margins tend to be higher.

But let's consider the following case: within the DSP Valley eco-system, research activities are being conducted to develop completely new bio-chips, bringing semiconductor processing know-how to biological processes, capable of doing high performance cell sorting or DNA sequencing. The performance of such a future chip will equal or outperform today's cell sorting or sequencing machines, measuring something like 2 m³ and costing half a million dollars… Then the obvious question rises: if such a machine of 2 m³ and 0,5 M$ can be replace by one single chip, what is than the value of such a chip? Half a million? Probably not. Probably the value will be less! Will the value be 1000 $? Probably more…

Should we develop new business models for these new generations of chips? Shall we look for models emphasizing the functionality and optimizing the added value?

Although I realize that the above reasoning is somewhat simplified, I am very curious to hear your opinions about innovative business models, and I will be very glad to initiate some discussions about this topic!

I am looking forward to hearing from you!

Best regards,

Peter Simkens
Managing Director
DSP Valley

BarcoSilex presents new framework for integration of hardware security at IP-SoC 2014

BarcoSilex is known for its high-quality IP blocks for hardware security that are among the most straightforward to integrate. Going a step further, we have now added a framework that allows SoC application developers to call the hardware cryptography transparently. The new framework was recently presented at the IP-SoC 2014 conference in Grenoble by BarcoSilex' Gregory Baudet and Sebastien Rabou, in a session dedicated to IP and SoC design methodology.

Hardware security is hot

In a panel discussion at Electronica 2014 in Munich, four CEOs from major semiconductor companies discussed the looming issue of data and device security for the Internet-Of-Things. But also for new applications in e.g. wearable health or self-drive automotive technology, security is essential. These new smart devices handle and transmit data that should remain confidential (medical, financial, military…), or signals that should not be manipulated (car-to-car or car-to-infrastructure, satellites, industrial equipment, sensors…).

Many of these new systems have short development cycles and are designed and implemented by software experts. But running cryptography algorithms in software may not be the best option. Due to their complexity, the cryptography algorithms may take so much computation power that nothing is left for the actual application. In addition, hardware security is inherently more secure, e.g. against side-channel attacks.

The solution, of course, is to implement cryptography in hardware and offload all authentication and encryption operations from the application processor. To do that, development teams of ASIC- and FPGA-based solutions revert to third-party IP cores. This is a time- and resource saving strategy if the IP is scalable, flexible, and easy to integrate. And preferably, the IP cores have to offload the cryptographic operations near 100%. This is not trivial, and required us to implement a build-in scatter/gather DMA, a scalable highly-pipelined data path, and an internal micro-coded sequencer for the asymmetric operations.

Imec – BSI CMOS Image Sensor Chip and high-quality image detector for FEI's scanning electron microscopes

Imec Presents Back-Side Illuminated CMOS Image Sensor with UV-Optimized Antireflective Coating

Imec presented a backside-illuminated (BSI) CMOS image sensor chip at the VISION 2014 in Stuttgart. The chip features a new anti-reflective coating (ARC) optimized for UV light. Targeting imaging solutions in new markets such as life sciences, the achievement is an important addition to imec's customized 200mm CMOS fab. This 200mm process line enables imec to offer design, prototyping and low volume manufacturing of custom specialty chip solutions such as highly specialized CMOS image sensors.

Known for its superior enhanced light sensitivity compared with image sensors using front side illumination (FSI), BSI sensors are top candidates to further improve the performance of CMOS image sensors. Widely spread today in consumer applications such as smart phones, BSI imagers are expected to enter the higher-end application space of e.g. industrial inspection.

BSI imagers have a clear advantage when it comes to fill factor for the pixel area, angular response, and the complete avoidance of absorption or scattering losses in the metal interconnect layers. The cost for these light gathering improvement are the extra process complexity for the backside fabrication and possible electrical and optical losses at the new backside silicon interface. Therefore the engineering of the backside layers and interfaces is key to develop high performance BSI devices ■

But software engineers prefer it hidden

Today, many SoC developers implement applications on top of the Linux OS, installed e.g. on the new SoC-FPGAs from Altera and Xilinx. For security, they call the functionality of OpenSSL. We now implemented a software stack that makes the OpenSSL library use the hardware cryptography. This completely hides the crypto hardware from the SoC developer.

On the deepest level, we developed the OS-independent drivers for the crypto hardware. A layer above, we wrote the necessary device drivers for the Linux kernel to access the hardware drivers. These kernel drivers, however, are not accessible from typical user-space programs and libraries such as OpenSSL. So we reconfigured the Linux CryptoDev middleware as interface between our new device drivers and OpenSSL. CryptoDev supports all major cipher and hash algorithms that will be called from OpenSSL and that are supported by the crypto hardware.

With this new framework, adding the power of hardware cryptography now become as easy as adding and recompiling a few software libraries. The result offloads close to 100% of the intensive crypto processing from the application processor. It also offers a superior performance at a low power usage, is highly scalable, and more secure than a comparable software implementation. ■

Imec manufactures high-quality image detectors for FEI's scanning electron microscopes

Imec announced today that it has successfully qualified a set of custom high-quality electron detector die products for FEI Company. The dies are manufactured at imec and integrated in FEI's scanning electron microscopes (SEMs), helping to enhance the tools' performance and reliability. This milestone achievement is another confirmation of the capability of imec's 200mm process line, developing and manufacturing custom specialty chip solutions.

Imec developed and processed the back scattered and stem electron sensors according to FEI's custom designs and specifications, with focus on superior sensitivity to low energy electrons and high reliability. ■

MegaChips Joins Imec and Holst Center's R&D program on Ultra-low Power Radio

Imec/Holst Center and MegaChips, a fabless company focusing on the development of system LSIs and products that incorporate original algorithms and architecture, announced that they have signed a strategic partnership for joint R&D on ultra-low power (ULP) short radio technology for smart homes and buildings.

By 2020, models predict roughly 50 billion connected devices will be in use. These battery operated or energy-harvesting operated sensors will communicate with each other and with the internet via small short range radios that consume little amount of power - not only when active but also in the stand-by mode - and at affordable cost for mass production.

Together, researchers from imec/Holst Center and MegaChips will develop an ultra-low power multi-standard sub-GHz radio solution (compatible with ZigBee 900MHz and IEEE802.15.4g) on CMOS technology, achieving a transmit power two times lower than current state-of-the-art (60mW) and a receive power five to 10 times lower (6mW). Ultimately, energy harvested solutions will enable fully-autonomous sensors. Even within this very modest power consumption, a programmable output transmitter up to 13dBm is provided. Together with the excellent -120dBm sensitivity, this performance enables a communication distance up to 2km in free space and guarantees reliable coverage in big industrial premises, in smart metering applications and in non-line-of-sight situations in smart buildings. ■

DraMCo (KU Leuven, Technology Campus Ghent) wins first price Texas Instruments Europe Analog Design Contest 2014!

DraMCo research group

Friday November the 14th 2014 was an exciting day for the researchers of the DraMCo-group of the Faculty of Engineering Technology, KU Leuven Technology Campus Ghent. They participated in the Texas Instruments Europe Analog Design Contest 2014. The number of submitted projects was very high (299 to be exact), from 145 universities, spread over 23 countries. A couple of weeks ago, they received the news that they were in the top 4. Considering the amount of submissions, this could already be considered as a victory!

The final results were to be announced at the Electronica 2014 event in Munich, Germany that Friday. The submitted project (entitled TIagnose Watch) was of an extra-ordinary quality, just like the three competing final projects. After a presentation and some stressful moments, the TIagnose Watch was announced as the winner of this contest! This is another confirmation for the outstanding work that is delivered by the DraMCo research group and by extension from this young Faculty of Engineering Technology. Hereby, we also want to thank explicitly the IWT Flemish funding agency for financially supporting the conducted research.

But what is the TIagnose Watch actually? The TIagnose Watch is a wristband device that was developed for medical staff in maternity hospitals. The device performs measurements of the body temperature, bilirubin levels and oxygen saturation of newborn babies in only 1.25 seconds by means of self-designed measurement techniques. Ease of use

GreenPeak Wins Deloitte Fast50 Technology Award

Fast50 recognition confirms market leadership and stable, sustained growth
For the third year running, GreenPeak has achieved a top 10 ranking

GreenPeak

GreenPeak Technologies, the industry leading Smart Home semi-conductor/systems company, has again won the prestigious Deloitte Fast50 award for technology companies in the Netherlands. With an impressive 8757% growth, GreenPeak moves into the first position and has secured its spot in the top 10 for the third year in a row.

The esteemed Deloitte Technology Fast50 annual award honors the fastest growing technology companies. The selection process is based on the percentage of operational revenue growth over the past five-year period. The award was created to showcase the remarkable contribution of technology companies to the growth of the economy.

"We are extremely pleased to have won as fastest growing technology company and to have maintained our top 10 position in the strong competition for the last three years," stated Cees Links, CEO. "The Deloitte Technology Fast 50 gives great profile to technology companies and is internationally recognized as being one of the most important business awards in our sector. In 2012 we ended 6th, in 2013 we were 3rd, and now we have grown to Number One! The whole team is very proud of this achievement! We are fortunate to have an incredibly talented, hard-working and passionate team of experts at GreenPeak, and that we are supported by a world-class ecosystem of partners. Both are essential to our ongoing worldwide success. The Smart Home technology and Internet of Things market continue to accelerate on a global scale, and we are excited by the opportunities ahead of us."

The award comes at a time when GreenPeak has accomplished major milestones in the past year, such as expanding the team, selling 1M chips per week, broadening its product portfolio and opening offices in China.

was a key factor in the design, resulting in a device without controls. It relies on a supercapacitor energy buffer, which can be charged wirelessly in less than 5 seconds by touching a Qi charger. Unprecedented wireless through-display powering was studied and applied by placing the Qi receiver coil behind the display. Also an energy study was carried out, revealing that a full buffer provides enough energy for 38 measurements or more than 3 days of stand-by time. After each measurement, the device automatically transmits the data wirelessly to a computer. The miniaturized device exists of 7 PCBs and contains solely ICs (17 pieces). It is equipped with a Qi receiver, a supercap charger, 3 power supplies and a state-of-the-art FRAM microcontroller that controls the sensors, the display, the wireless transmitter and even its own power supplies.

For companies interested in wireless charging and/or sensor equipped integrated solutions, it is clear that the KU Leuven DraMCo expertise is among the best in Europe! ■

About GreenPeak Technologies

GreenPeak Technologies is an award winning fabless semiconductor/system company and the world recognized leader in the IEEE 802.15.4 and ZigBee market with a rich offering of semiconductor products and software technologies for Smart Home data communications and the Internet of Things. The GreenPeak founders have significantly contributed to the invention of WiFi and made it into a commercial success, used by several billion people today.
GreenPeak is recognized as a leader in developing new wireless technologies for consumer electronics and Smart Home applications, demonstrating rapid growth and adoption by major customers.
For more information, please visit www.greenpeak.com.

New DSP Valley member ACE Electronics in the spotlights

For over 20 years now, ACE electronics NV has been an established value in the world of electronics. Through our years of professional experience, personal approach, flexibility and up-to-date production machinery, we are your ideal partner for the overall solution to your project. This applies throughout the entire process from design up to small and large production series.

ACE electronics does not only provide the development and assembly of printed circuit boards but also the complete assembly of electronic equipment. ACE electronics is your partner for project analyses, product development and design, prototypes, logistical support, production series, functional tests, packaging and shipment as well as after sales.

The choice of the electronic components will always be done in collaboration with the customer, with a view toward price, availability and production technology aspects.

The mounting of SMD parts is entirely mechanized and is followed by a 100% visually and tested functionally. This all happens strictly in collaboration with the customer.

With our approximately 50 employees, the idea is to be and to remain a flexible and reliable subcontractor offering decent quality and delivery terms. In consultation, call-off orders are possible on a yearly basis. We use completely up-to-date machinery that supports all recent technologies for the handling and production of all actual electronic components. At the core, the ERP system stands for a driven sales, purchase, supply and production management and is controlled by an ISO9001:2008 quality system. For specific areas e.g. wires and cables, different mechanical parts, inspections, etc. we will work together with specialized external organizations and companies. ■

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Utilize Zynq's ARM + FPGA processing for new industrial applications with Antmicro

antmicro EMBEDDED SYSTEMS

Antmicro's experience with Zynq in particular has led to the cooperations with two fantastic open-source projects - Parallella and Axiom - which act as enablers for portable high performance computing and affordable professional digital filmmaking respectively.

At Embedded Conference Scandinavia in Stockholm this year Antmicro showed how a proper partitioning of processing between embedded software and FPGA can yield a significant speedup to algorithms used in data-intensive applications such as vision systems, and vision continues to be one of the primary focuses of the company, a specialization it shares with DSP Valley of which it recently became associated member.

Coupling the wildly popular Cortex-A9 CPU with a powerful FPGA fabric, Xilinx Zynq is enabling a whole range of new embedded applications where custom-made hardware blocks dedicated to application-specific processing tasks can be enchanced with the general purpose computing capabilities and broad software base of the embedded ARM world.

However, to fully benefit from this higher level of integration offered by Zynq requires both embedded software and FPGA skillsets, and the two worlds have traditionally been somewhat separated from each other. With Zynq, integration implies cooperation, as FPGA developers cannot learn to program their Linux application overnight, and even the simplest hardware accelerator could pose a serious challenge for an RTOS programmer.

Add some Zynq-specific caveats and the accompanying jargon into the equation and it is perfectly understandable why the SoC - even though extremely successful - still has a huge potential for growth.

Combining a strong embedded software background and FPGA competence, Antmicro has been working to facilitate the adoption of Zynq across multiple application fields. This includes creating IP cores, extension boards and device drivers and porting operating systems such as Linux, Android, and the eCos RTOS for various types of Zynq hardware, most notably the SO-DIMM module from our Swiss partner, Enclustra.

To realize the full potential of software portability across ARM platforms, as is critical to the SoC's success, Antmicro is drawing from its rich experience with similar ARM platforms where it has been striving not to customize that which can be reused. For this reason, many of the software components created by Antmicro run across various types of Zynq platforms with little to no modifications. ■

KHLim, KHLeuven and the former Group T - Leuven Education College collaborating under new name: UCLL

KHLim, KHLeuven and the former Group T – Leuven Education College, now Unesco Teacher Education, are now collaborating under one name: 'UC Leuven-Limburg'. This is an important next step for the 3 university colleges in the current collaboration- and integration process.

UC Leuven-Limburg, a name that underpins the vision and strategic priority to become Flanders' strongest university college, with an outspoken international profile and strong ties with KU Leuven, aka University of Leuven. The axis between the city of Leuven and the province of Limburg is a deep-rooted one of which the 3 educational institutions are proud and which they therefore want to propagate by referring to this axis in their new name.

The collaboration enables UC Leuven-Limburg to combine forces and invest more in research projects, innovative education and opportunities for students. The coming year, 'Moving Minds Projects' will be set up in collaboration with students, partners, and regional stakeholders.

UC Leuven-Limburg benefits students in various ways: the collaboration combines the 3 university colleges' strong reputations, heightening the chances of its graduates on the job market even more. Aside from this, it will become easier for students to draft a tailor-made study programme. Also, the selection of internship providers and research projects, and UC Leuven-Limburg's international network will expand considerably. ■

KHLim MOVING MINDS

Quantum SpinOff wins European Scientix Resources Award

For too many pupils, the intriguing connection between the fundamental scientific knowledge they study at school and the technological innovation they see around them unfortunately remains a closed book. The Quantum Spin-Off project tries to bridge this gap with the goal to educate a generation of scientifically literate citizens and inspiring young people to choose for science and technology careers.

During the course of one school year science teachers of secondary schools and

their pupils meet researchers and entrepreneurs in the high-tech nano sector. Moreover, as teams, guided by their science teachers, they are challenged to create a responsible and socially relevant valorisation of a scientific paper in collaboration with actual researchers and entrepreneurs. They visit high-tech research labs and nanocompanies. DSP Valley coordinates the visits of the schools to the nanocompanies while the research group "Vakdidactisch Centrum" of the KHLim (now part of the University Colleges Leuven-Limburg) promotes the whole project.

Quantum SpinOff started as a Flemish project, funded by the Agentschap Ondernemen and now also by DSP Valley. But in the meantime the project was noticed by the European Commission who funded the further spread of this project into Greece, Estonia and Switzerland. This makes it possible for the Flemish schools to compete for the European Quantum Spin-Off Prize too.

The Research Group "Vakdidactisch Centrum" developed a set of learning stations on the connection between modern physics, its technological applications and entrepreneurship.

During the 2nd Scientix Conference held in Brussels on 24-26 October 2014, the Quantum SpinOff project has been awarded the 1st Scientix Resources Award Category 2, STEM teaching material specifically addressed to students. The award has been assigned to "Learning Station II: What is light?", in the presence of Dr. Maria Korda, Policy Officer at the Research and Innovation DG of the European Commission. As a result the learning station will be translated in the 24 official EU languages, and the awarded material will be the focus of presentations and workshops in the Scientix Science Projects Workshop in the Future Classroom Lab and further promoted on the Scientix portal, in the newsletters, at Scientix events and media campaigns.

For interested teachers who want to get acquainted with the proposed methodology, a summerschool is organised in the 2nd week of July 2015. The Vakdidactisch Centrum organizes also many professional development courses for teachers where many times new insights in science are connected with technology used in numerous high tech companies. See www.vakdidactiek.be

Partners:

- Hasselt University, research group IMO-IMOMEC
- KU Leuven, Department of Physics and Astronomy
- Antwerp University, research groups Visielab & Bimef and the Department of Physics
- KU Leuven, Diepenbeek Campus, research group Embedded Systems & Security
- Ellinogermaniki Agogi (Greece)
- Fachhochschule Nordwestschweiz (Switzerland)
- University of Tartu (Estonia)
- European Schoolnet

Collaborating companies:

- Imec Leuven
- DSP Valley

The Flemish Quantum Spin-Off project is funded by the Agentschap Ondernemen as a brugproject. The further European outreach and European competition is funded by the European Commission under the LLP Comenius programme (540059-LLP-1-2013-1-BE-COMENIUS-CMP).

DSP Valley - the role of biosensors in tomorrow's healthcare

"The next big thing" we will not find in the current generation of health-sensors but in the world of biosensors.

MIC Flanders interviewed Frederik Horemans, responsible for Smart Health at DSP Valley. Frederik is project coordinator for the GENEESS project and project member in the Nano4Health project.

Here are some highlights of the interview, the full article can be read at the following URL: http://www.micv-laanderen.be/word-geinspireerd/door-interviews/frederik-horemans/

In the ideal world it would be great to detect on the spot whether you are infected with a virus like for example Ebola. Nowadays only indirect measurements like temperature monitoring are being used to screen people at the airport for instance. Temperature is not an accurate or reliable parameter to screen for Ebola since fever can have many causes. To be sure of an Ebola infection,

complicated and expensive clinical lab tests are necessary. This is not feasible as a standard screening method. Therefore biosensors will come into play as a possible solution in the future of fast health screening.

First steps: mobile labs

The opportunity can be situated at the interface between mico/nano electronics and biotechnology. In both domains many Flemish companies and research institutes are active (imec and VIB) and new developments in the cross domain are happening right now. One of the leading Flemish companies in this cross domain is Biocartis. The company developed a small automated lab device able to do multiple tests including full sample preparation. This makes it possible to work decentralized, faster and without human errors.

The future: Point of Care devices & Lab-on-chip

In the future, due to the miniaturization, we expect the development of small handheld devices and even disposable lab-on-chip systems. They will be used by a caregiver or the patient himself to follow up a given biological parameter on the spot or in a continuous manner. Imec's research towards individual cancer cell detection for example is already very promising regarding what will be the possibilities in the future.

At the heart of Vision Technology - DSP Valley

From November 4th to November 6th, DSP Valley participated in the first two-yearly edition of VISION in Stuttgart, Germany. Easics, IntoPIX and Test&Measurement Solutions decided to join us and have a desk at the DSP Valley booth. IntoPIX highlighted their Tico, a tiny JPEG2000 codec. Easics focused on their design services and the applications in the specific embedded vision domain. Test&Measurement Solutions showcased their expertise in quality and inspection systems, using camera technology.

During the three days of the fair, almost 9.000 visitors found the way to the Stuttgart Messe and visited the booths of 432 exhibitors from all over the world. This year there was also a large Asian delegation present both as exhibitors and as visitors.

With regards to the vision technology, the rise of different 3D vision systems and applications making use of Time-of-flight systems stood out. More in particular are these systems used in the multitude of machine vision applications. Also the industrialization of small camera systems for all kind of applications was shown on the fair grounds. This means that the technology becomes more and more robust and usable in different kinds of environments.

A final, but for us maybe the most important thing to notice, is the recognition for the Belgian expertise in the design of CMOS image sensors. Companies like CMosis, ONSemi and Caeleste had a prominent place in the exhibition. Their sensors were present

Pharma as sponsor

The pharmaceutical industry has a lot of interest in these type of technologies because early detection of a certain disease or condition will benefit them. Also the worldwide trend towards "performance-based reimbursement" stimulates the development of this type of advanced diagnostic systems. In this case these devices will be used as a "companion diagnostic" for a given therapeutic drug. In this way several parameters can be monitored to check if the treatment works and the therapy should be continued or fine-tuned. These findings will also help for a better understanding of biological processes and how to ameliorate a drug.

It is clear we are just at the beginning in the field of biosensors. It is a challenging domain but it has an enormous potential to improve healthcare drastically.

dsp valley
designing smart products

on a lot of the booths, underlining that their technology enables a lot of the camera systems to be used in a wide spectrum of applications.

For the next edition in 2016, DSP Valley is hoping for and working on a possibility to emphasis even more the expertise of our region in the domain of vision technology. For now, certainly mark November 8 to 10, 2016 in your agenda for another exciting fair at the heart of vision technology.

VISION
Leading world trade fair for machine vision

Welcome to planet e – Electronica München – DSP Valley

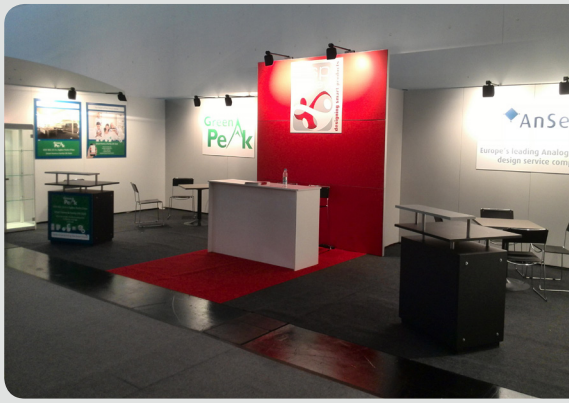
electronica 2014
inside tomorrow

50 years is the respectable lustrum that the Electronica Fair was able to celebrate from 10 to 14 November this year (2014). 50 years, that means that the fair was held for the 26th time at the Messestadt in München, Germany. It also was the first time that DSP Valley participated with a group booth.

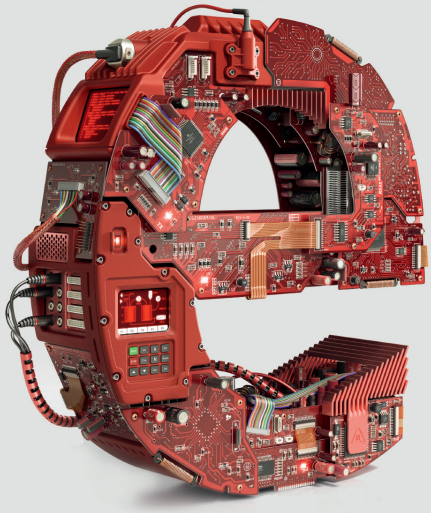
A modest start, because only two member companies decided to join, AnSem and Greenpeak Technologies. However, a quick look in the catalogue showed some other members also participating: OnSemiconductor, NXP Semiconductors, Freescale, EBV Elektronik, Arrow, Hamamatsu, Keysight Technologies, Silica, TE Connectivity and Eurotronics at the booth of CEE, their Chinese partner.

Electronica means four days of activity on the largest European fair in the electronics technology domain. More than 70.000 visitors came to visit the more than 3.000 exhibitors in twelve halls of the Münchener Messestadt. Everything you can think of when looking for electronic (hardware) systems is there to find, from connectors and sensors over printed circuit boards to active semiconductor components.

On the DSP Valley booth, there was plenty of interest for the two participating companies and DSP Valley as the cluster organization. Greenpeak Technologies showcased their Zigbee technology and the usage in the domain of Smart Home. AnSem focused on their design services used in medical applications and powerline communications for Smart Home applications.



In 2016, from November 8 to 11, München will again be the meeting place for the European electronics industry. DSP Valley will most likely be joining again with a group booth, hopefully with a few extra co-exhibitors.



Verhaert & BNV Mobility launch new mobility service myJINI

BNV Mobility, a BRISA, EGIS and NedMobiel owned company, is one of the pioneers in mobility services in the Netherlands. The mobility experts of BNV work on innovative solutions to improve the accessibility, liability and road safety of people.

To develop a new advanced concept, they choose Verhaert as their strategic partner. The international program 'Verhaert Connect' (www.verhaertconnect.com) was the deciding factor to go into business with Verhaert. This multidisciplinary program is executed with specialist teams from the Netherlands, Belgium and Portugal.

Verhaert & BNV Mobility started by defining the service and business model for this new concept. What mobility services can you offer to lead to positive behavioural changes? And what business model can be linked to it? The results of this exercise became a starting point in creating new and innovative value propositions. By performing qualitative consumer research Verhaert explored the appreciation and willingness to pay for the designed functionalities. In parallel our specialist team in Portugal developed the frontend. In close cooperation with Brisa Innovation & Technology, located in Lisbon, they took care of the technical development, from programming to design.

The launch of www.myjini.nl brings a new integrated mobility service to the market. Promoting 'safe driving' as an incentive, BNV encourages behavioural change in a new and positive way. JINI$ can be earned to pay for fuel or other services. This goes beyond traditional loyalty systems and empowers consumers to create their ideal mix of competitive conveyance. Thereby, BNV exceeds other mobility services offered in Europe. myJINI offers companies and governments the opportunity to add extra motivational programs, such as the Verkeersonderneming Rotterdam offering an extra reward to commuters in the Rotterdam area who avoid rush/hour traffic. ■

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Imec academy has a tradition of many years to record trainings and gathered a large portfolio of seminars and courses to stream to your desk. You have the possibility to watch these lectures from top experts from all over the world. You can save time and plan your training activities in your working agenda. This flexible way of working can also save expenses for your company e.g. by setting up a team training at your site. You can take the opportunity to browse through our catalog and find some courses on Analog design, Solar cells, Advanced packaging, Nanoscience in biological systems, ...

Due to imec academy's newest technology in online streaming the recording is streamed into dual video which translates in a better video quality. This makes it more comprehensive for the streaming audience to follow, and makes it possible for you to have an almost live experience.

Starting from 2015 imec academy offers a new training format for hands-on courses. You can watch the lectures from your desk and only come onsite for the hands-on exercises and to face-to-face interaction with our experts. If you are interested in this way of learning we look forward for companies who will join us for this new approach.

You are invited to experience the live streaming at first hand, just browse through our offer on imec academy – and know that a lot of seminars are free to watch: www.imecacademy.be ■

Triple Engineering

An innovation project with the financial support of Provincie Vlaams-Brabant

MEMBER OF ASSOCIATIE KU LEUVEN

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Engineering–Educating–Enterprising

Triple Engineering is a 2-year project that aims to create a structured environment in which the promotion of the entrepreneurial spirit of students and the exchange of knowledge between engineering expertise, education and companies can flourish.

Knowledge transfer between education and (SME) companies through innovation

SMEs in need of engineering skills to realize an innovative idea related to future-oriented research domains like Sustainable Engineering and Health Engineering, can cooperate with Group T staff and future engineers to investigate the feasibility or even to develop a prototype of their idea. Teachers and researchers help in the design and technical decision making, and bachelor's or master's students work on the implementation of a proof-of-concept or prototype. The project is executed at Group T, under the supervision of teachers. The clients do not need to have the technological expertise or equipment themselves. These projects are accompanied by all kinds of risks. That's why it is so important that the clients are actively involved during the entire lifetime of the project so that the intermediate results can be judged in the proper context and misunderstandings at the end of the project are avoided. This approach furthermore allows for the execution of educational assignments in a more realistic and professional context.

Several innovation projects are already realized but more will follow in the future. In one such project, a prototype embedded system to remotely monitor power generators of ThePowerShop

Track&trace and remote monitoring of power generators

was developed and tested. Meanwhile, the company has developed a commercial product based on this prototype. For D&D Isoltechnics, a prototype sensor system was implemented to detect corrosion under insulation (CUI). In a follow-up project, we are currently working on a real CUI sensor monitoring system such that multiple sensor nodes cooperate together and upload their sensor values to the cloud for remote monitoring of entire technical installations.

The student-entrepreneur

The Triple Engineering project also creates the opportunity to the enterprising student to make the best way to prepare its own start-up. The student will have the opportunity to follow courses and trainings on high-tech innovation and starting up a business, will be admitted to networking events and workshops for entrepreneurs, and is personally tailored and supported with technology and business advice. Currently, this program is integrated as an extra profile in the post-graduate program of "Innoverend ondernemen als industrieel ingenieur". During this program, the student has the opportunity to start focusing much more on entrepreneurship, building a business network, the preparation of an individual business plan and even the implementation of a first product. Currently, the program counts around 16 students of which many are working on very concrete business ideas. ■

6LoWPAN – Towards Zero configuration for Wireless Building and Home Automation

In the 6LoWPAN project (IWT-TETRA, 2013-2014), we have studied the possibilities and limitations of an IP-based protocol for 802.15.4 wireless technology, called 6LoWPAN. The 6LoWPAN protocol is a rather new, open standard and low cost protocol that allows sending IPv6 packets, on top of the 802.15.4 radio signals. Since the protocol is IP-based, no additional layer or logic is required for communication with a node in or outside the network. This feature is a big advantage compared to the (licensed) Zigbee protocol.

As an application, we have built some IP-based wireless sensor and actuator networks, controlling the automation of wireless systems coupled with electric devices (in the context of home and building automation). The network architecture is 3-layered, consisting of a central server, edge routers and embedded motes. The network is accessible from a server, on which the status of the different nodes can be monitored and controlled. Dedicated security "plug-in" modules are developed, enabling authentication and confidentiality in the communication. The total impact of the added security protection is limited to a minimum in memory occupation and power consumption. The system is evaluated for different parameters, including power consumption, usability, range, scalability, cost and power consumption.

In addition, the researchers have also implemented two use cases that highlight the seamless integration of IP-enabled nodes with existing IP-based infrastructure. The first case was realized in collaboration with Rmoni Wireless NV. and involves the replacement of Zigbee communication on Rmoni sensor-modules with 6LoWPAN communication. The second case was established in collaboration with COMmeto and describes a voice-over-IP intercom system based on the SIP protocol. The system makes use of 6LoWPAN communication to transfer audio data and uses existing infrastructures like Asterisk to connect to IP-phones on the Internet. The advantages of being compliant with voice-over-IP standards are the interoperability and expanded functionality (voicemail, email notifications, ...) through existing components on the Internet with minimal configuration.

The project was realized by VUB and KU Leuven and was supported by the TETRA fund of the IWT. ■

KU LEUVEN iwt Vrije Universiteit Brussel

How to Resolve the Upcoming ZigBee - Bluetooth War

GreenPeak Technologies, the industry leading Smart Home semi-conductor/systems company, has posted a new white paper regarding the oncoming war between ZigBee and the new version of Bluetooth – Bluetooth Mesh. The white paper explores the confusion and damage created by previous battles between home networking standards and how this damage can and should be avoided in the near future.

"A decade ago, WiFi and Bluetooth battled but ended up sharing the home networking space and successfully growing the market to where both technologies are now found everywhere," explains Cees Links, CEO of GreenPeak Technologies. *"The battle is brewing again as Bluetooth Mesh is now attempting to move from the sensor wearable space into the ultra-low power sensor networking space, today successfully served by ZigBee. However, it will take a lot of work to evolve Bluetooth Mesh to the position where it can provide the functions and capabilities that ZigBee already provides today. So why confuse and divide the market?"*

We expect the industry to respond the same way as it did in the previous decade – realizing that Bluetooth is the perfect solution for peripheral devices and wearables, whereas ZigBee is the optimal networking solution for connecting the hundreds of sentrollers (sensors, controllers and actuators) that will be functioning in our homes within the next few years.

The new GreenPeak whitepaper "Bluetooth and ZigBee: a new standards war?" is available for free download at www.greenpeak.com/technology/whitepapers.html ■

GreenPeak

Training Multicore Programming

January 19-21, 2015
Eindhoven, The Netherlands

http://www.multicoreprogramming.com/

Have you realized that processors have not gained a lot of performance per core over the last few years? Is your application truly benefiting from modern multicore processors? Or did your application just slow down when you tried to use multiple cores?
Don't worry!

Vector Fabrics in Eindhoven organizes training classes to teach advanced C and C++ engineers how to use multicore processors efficiently. We only talk a little bit about threading and locking - it's mostly about patterns and concepts. In 3 days we'll learn you to design future-proof code that works well with multiple processors - and you'll know how to keep it free of hard-to-debug errors like race conditions and deadlocks.

Vector Fabrics is a world-wide known expert in optimizing software performance. Either by using our Pareon tooling or through training and consultancy, our customers get more performance out of their hardware platforms.

Embedded Linux training

January 19-23, 2015
Brussels, Belgium

www.mind.be/training

This 5 days training is intended for developers who want to build an Embedded Linux system from scratch or from commercial Embedded Linux solutions.
The training covers the various components of an embedded Linux target, the development choices and the different debugging possibilities. A more detailed look is also taken at the Linux kernel architecture and important issues such as cross compilation and building of the main components. The training finishes with some more specific subjects to the choice of the participants (such as Real Time Linux, Qt development or building from distribution of choice).

During this training all participants get the opportunity to build and experiment with a multifunctional small-footprint embedded target with an LCD touch screen, which they can take with them after the training.

Mind is Essensium's embedded software division, which provides Consultancy and Services in the field of Linux and Open Source software for Embedded Systems.

Among other things, Mind is organizing a range of trainings about Embedded Linux, Linux Device Drivers and Android. These trainings take place on a regular basis in Brussels (Belgium), but they can also be customized upon request to better target a specific project context (HW platform, distribution, etc...) and can be made onsite at a date that is suitable for the customer's development team.

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BarcoSilex presents new framework for integration of hardware security at IP-SoC 2014 • p. 4
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New DSP Valley member ACE Electronics in the spotlights • p. 7
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Verhaert & BNV Mobility launch new mobility service myJINI • p. 12
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